

# EUROPEAN PATENT OFFICE

## Patent Abstracts of Japan

PUBLICATION NUMBER : 01286348  
PUBLICATION DATE : 17-11-89

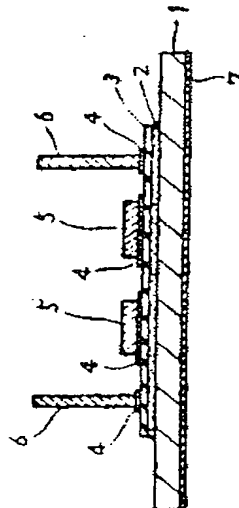
APPLICATION DATE : 12-05-88  
APPLICATION NUMBER : 63117716

APPLICANT : MITSUBISHI ELECTRIC CORP;

INVENTOR : YAMAGUCHI TETSUJI;

INT.CL. : H01L 23/36

TITLE : SEMICONDUCTOR DEVICE



ABSTRACT : PURPOSE: To decrease contact heat resistance at the time when it is attached to a cooling plate by providing a metallic plate which has thermal expansion coefficient almost the same as that of an insulating substrate on the other face of a heat radiation plate.

CONSTITUTION: A metallic plate 7 having thermal expansion coefficient almost the same as that of an insulating substrate 3, for example, 42 alloy (Fe 58%, Ni 42%) is attached to the reverse of a heat radiation plate 1. In the case that the insulating substrate 3 is alumina ceramics, that thermal expansion coefficient is  $6.7 \times 10^{-6} 1/^{\circ}\text{C}$  and that of 42 alloy is  $4.2 \times 10^{-6} 1/^{\circ}\text{C}$ , therefore when it is cooled after the insulating substrate 3 is soldered to the heat radiation plate 1, the heat radiation plate 1 slightly bends convexly toward the metallic plate 7 side, but by fastening and fixing both sides of the heat radiation plate 1 with screws, the bending of the heat radiation plate 1 is rectified such that it becomes parallel with the surface of the cooling plate. Accordingly, contact heat resistance resulting from space generated between the cooling plate and the heat radiation plate can be neglected.

COPYRIGHT: (C)1989,JPO&Japio